

## Patent claims

1. A method for the automatic retrieval of engineering data from an automation system with a multiplicity of individual automation objects (RAO1..RAO4), in which method,
- for the restoration of representatives (G1, G2, AO1..AO4) in an engineering system of objects (RG1, RG2, RAO1..RAO4) of the automation system,
- the objects (RG1, RG2, RAO1..RAO4) supply an identifying designation of a type of their respective representative (G1, G2, AO1..AO4) to the engineering system,
- the engineering system creates corresponding representatives (G1, G2, AO1..AO4) for the designated types and in the case of each of the representatives (G1, G2, AO1..AO4) enters a reference to the object (RG1, RG2, RAO1..RAO4) and, by means of the reference, each representative (G1, G2, AO1..AO4) reads out engineering information from the object (RG1, RG2, RAO1..RAO4).
2. The method as claimed in claim 1, characterized in that, in a first step for the restoration of device representatives (G1, G2) in the engineering system, devices (RG1, RG2) on which the automation objects (RAO1..RAO4) run supply an identifying designation of a type of their respective device representative (G1, G2) to the engineering system,
- the engineering system creates corresponding device representatives (G1, G2) for the

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designated types and in the case of each of the device representatives (G1, G2) enters a reference to the device (RG1, RG2) and, by means of the reference, each device

representative (G1, G2) reads out engineering information from the device (RG1, RG2) and, in a second step for the restoration of representatives (AO1..AO4) of the automation objects (RAO1..RAO4) in the engineering system,

the automation objects (RAO1..RAO4) supply an identifying designation (ESO type ID) of a type (ESO type) of their respective representative (AO1..AO4) to the engineering system, the engineering system creates corresponding representatives (AO1..AO4) for the designated types and in the case of each of the representatives (AO1..AO4) enters a reference to the automation object (RAO1..RAO4) and, by means of the reference, each representative (AO1..AO4) reads out engineering information from the automation object (RAO1..RAO4).

3. The method as claimed in claim 2, characterized in that, in a third step for the restoration of communication relationships between the representatives (AO1..AO4) of the automation objects (RAO1..RAO4) in the engineering system, the devices (RG1, RG2) supply lists with communication relationships to the engineering system, in the engineering system, entries of the lists are converted into references to inputs and

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outputs of the representatives (AO1..AO4) of the automation objects (RAO1..RAO4) and, subsequently, corresponding connections are set up in the engineering system.

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4. The method as claimed in one of the preceding claims, characterized in that both the objects of the engineering system (G1, G2, AO1..AO4) and the objects (RG1, RG2, RAO1..RAO4) of the automation system are described by a uniform, executable object model and a direct communication at model level is possible between the objects of the engineering system (G1, G2, AO1..AO4) and the objects (RG1, RG2, RAO1..RAO4) of the automation system.

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5. The method as claimed in claim 3 or 4, characterized in that entries in the lists with communication relationships contain sources and drains of the communication relationships, the sources and drains in each case being described by a 3-tuple from an identifier of the device (RG1, RG2), an identifier of the automation object (RAO1..RAO4) and an identifier of the input or output.

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6. The method as claimed in one of the preceding claims, characterized in that the objects (RG1, RG2, RAO1..RAO4) of the automation system have no direct reference to the associated objects of the engineering system (G1, G2, AO1..AO4), to make it possible for the engineering system and automation system to be separated.

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- 5 7. The method as claimed in one of the preceding claims, characterized in that the method is used for the updating of already existing engineering information as a delta method.
- 10 8. A system for the automatic retrieval of engineering data from an automation system with a multiplicity of individual automation objects (RAO1..RAO4), in which,
- 15 for the restoration of representatives (G1, G2, AO1..AO4) in an engineering system of objects (RG1, RG2, RAO1..RAO4) of the automation system, the objects (RG1, RG2, RAO1..RAO4) contain an
- 20 identifying designation of a type of their respective representative (G1, G2, AO1..AO4) for being supplied to the engineering system, the engineering system contains means for creating representatives (G1, G2, AO1..AO4) for
- 25 the designated types and means for entering in the case of each of the representatives (G1, G2, AO1..AO4) a reference to the object (RG1, RG2, RAO1..RAO4), the reference being provided for the reading
- out of engineering information from the object (RG1, RG2, RAO1..RAO4) by each representative (G1, G2, AO1..AO4).
- 30 9. The system as claimed in claim 8, characterized in that, for the restoration of device representatives (G1, G2) in the engineering system,
- devices (RG1, RG2) on which the automation objects (RAO1..RAO4) run contain an identifying

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designation of a type of their respective device representative (G1, G2) for being supplied to the engineering system,

the engineering system contains means for creating device representatives (G1, G2) for the designated types and means for entering in the case of each of the device representatives (G1, G2) a reference to the device (RG1, RG2),

the reference being provided for the reading out of engineering information from the device (RG1, RG2) by each device representative (G1, G2) and in that, for the restoration of representatives (AO1..AO4) of the automation objects (RAO1..RAO4) in the engineering system,

the automation objects (RAO1..RAO4) contain an identifying designation (ESO type ID) of a type (ESO type) of their respective representative (AO1..AO4) for being supplied to the engineering system,

the engineering system contains means for creating representatives (AO1..AO4) for the designated types and means for entering in the case of each of the representatives (AO1..AO4) a reference to the automation object (RAO1..RAO4),

the reference being provided for the reading out of engineering information from the automation object (RAO1..RAO4) by each representative (AO1..AO4).

10. The system as claimed in claim 9, characterized in that, for the restoration of communication relationships between the representatives (AO1..AO4) of the automation objects (RAO1..RAO4)

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in the engineering system,  
the devices (RG1, RG2) contain lists with  
communication relationships for being supplied to  
the engineering system and  
5 the engineering system contains means for  
converting entries of the lists into references  
to inputs and outputs of the representatives  
(AO1..AO4) of the automation objects (RAO1..RAO4)  
and means for setting up the corresponding  
10 connections in the engineering system.

11. The system as claimed in one of claims 8 to 10,  
characterized in that both the objects of the  
engineering system (G1, G2, AO1..AO4) and the  
15 objects (RG1, RG2, RAO1.. RAO4) of the automation  
system are described by a uniform, executable  
object model and a direct communication at model  
level is provided between the objects of the  
engineering system (G1, G2, AO1..AO4) and the  
20 objects (RG1, RG2, RAO1.. RAO4) of the automation  
system.

12. The system as claimed in claim 10 or 11,  
characterized in that entries in the lists with  
communication relationships contain sources and  
25 drains of the communication relationships, the  
sources and drains in each case being described by  
a 3-tuple from an identifier of the device (RG1,  
RG2), an identifier of the automation object  
(RAO1..RAO4) and an identifier of the input or  
30 output.

13. The system as claimed in one of claims 8 to 12,

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5 characterized in that the objects (RG1, RG2, RAO1..RAO4) of the automation system have no direct reference to the associated objects of the engineering system (G1, G2, AO1..AO4), to make it possible for the engineering system and automation system to be separated.

10 14. The system as claimed in one of claims 8 to 13, characterized in that the system is used for the updating of already existing engineering information.

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